



# Blast off!



with UniServe Science  
<http://science.uniserve.edu.au/school/>

## An Introduction to Rocketry Science for Primary Students

### Teachers Guide

These activities were originally designed by UniServe Science for the Social Inclusion Group – Compass Launch at The University of Sydney but are readily adaptable to any classroom setting. We have also included suggestions for Extension activities and links to other curriculum areas. All details can also be found on our website at [http://science.uniserve.edu.au/school/curric/k\\_6/space.html](http://science.uniserve.edu.au/school/curric/k_6/space.html)

#### Intended Outcomes

- Students have experience in hands-on science activity
- Students can explain and discuss the concepts of force, fuel and energy
- Students have experience in estimation (time taken for “launch” and distance “rocket” will travel)

These are linked to the following NSW Learning Outcomes for Stage 3 Science and Technology:

Students will

- know and understand that there are various forms of energy.
- show some relationship between the process of investigation and the process of designing and making.
- discuss the factors that might affect an investigation.
- be curious about the natural and made environment.
- gain satisfaction from their efforts to investigate, to design and make, and to use technology.

(NSW Board of Studies)

### A. The Activities

This section details the activities included. You are encouraged to adapt and amend these for your particular classroom needs.

The Alka Seltzer rocket activity is based on a worksheet accessed via the UniServe Science website – in our K-6 Curriculum resources section on Space.

1. Divide students in pairs (of roughly equal size) and get them to sit back-to-back with arms linked. They need to work together to stand up.
2. Discuss with students what happened and why. This demonstrates the ideas of
  - a. Push forces
  - b. For every action there is an equal and opposite reaction (Newton's Third Law of Motion)
3. Introduce the notion of energy by asking what students had for breakfast and explain that this gives them their fuel for the day.
4. Demonstrate what happens when Alka Seltzer tablet is placed in a beaker of water
  - a. What is happening?
  - b. What is causing this?
5. Explain that we are going to use the energy of this gas to fuel a rocket
6. Students make rocket as per attached guidelines (please note that we adapted these instructions slightly and did not make a body for the rocket.  
[http://www.spacegrant.hawaii.edu/class\\_acts/AlkaRocket.html](http://www.spacegrant.hawaii.edu/class_acts/AlkaRocket.html))

From testing we recommend that you only use canisters with lids that close inside the canister; half-fill with water and use one tablet; place rockets on a flat hard surface

7. firstly point out safety actions – stand back and don't go near until rocket has launched. Students need to observe
  - a. how long it took for rocket to launch (this should be approx 10 seconds)
  - b. how high rocket flew (this can be up to 5m so need to think about ways to measure)
8. View video of space shuttle launch and compare with own rockets
  - a. eg <http://www.youtube.com/watch?v=4FROxZ5i67k>

## **B. Extension Activities**

1. Variables that can be incorporated into the experiment include
  - a. Relative amounts of water and Alka Seltzer tablets – what affect does this have on performance of rocket; what is ideal ratio
  - b. Add different cones, fins to rocket – shapes, material – does this have any effect on performance
2. This could lead on to discussions about gravity (see Section on our website for more ideas) [http://science.uniserve.edu.au/school/curric/k\\_6/gravity.html](http://science.uniserve.edu.au/school/curric/k_6/gravity.html)

## **C. Links to Astronomy**

This activity can lead to a more in-depth study of Astronomy, including through the questions

- What are rockets used for?
- Where do they go?

## D. Links to other curriculum areas

This activity can also provide links to other curriculum areas, including

1. Art – design and colour a body for the rocket
2. History – investigate Newton and his contribution to science and society
3. Literacy – write a poem about rockets and space
4. Music – write a song about rockets
5. Mathematics – complete table and draw graphs to compare distances flown of class rockets – use these to discuss average and mode; further discussions of ratios
6. Nutrition and food sources – eg what types of food are best as energy sources

## Useful links

UniServe Science K-6 resources [http://science.uniserve.edu.au/school/curric/k\\_6/](http://science.uniserve.edu.au/school/curric/k_6/)

UniServe Science K-6 Space module

[http://science.uniserve.edu.au/school/curric/k\\_6/space.html](http://science.uniserve.edu.au/school/curric/k_6/space.html)

Force, Work and Power <http://www.physics.ucla.edu/k-6connection/force/wp.htm>

Newton's Laws of Motion <http://homeschooling.about.com/od/learning/qt/scinewton.htm>

## References

Hawaii Space Grant Consortium (1996) Alka Rockets. *Exploring Planets in the Classroom*.

[http://www.spacegrant.hawaii.edu/class\\_acts/AlkaRocket.html](http://www.spacegrant.hawaii.edu/class_acts/AlkaRocket.html) (13 May 2009).

NSW Board of Studies *Science and Technology K-6*

[http://k6.boardofstudies.nsw.edu.au/files/science-and-technology/k6\\_scitech\\_syl.pdf](http://k6.boardofstudies.nsw.edu.au/files/science-and-technology/k6_scitech_syl.pdf) (9 June 2009)



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## Student Worksheet

In this activity we looked at several important ideas including

***Energy***

***Fuel***

***Forces***

Answer these questions based on the Rocketry activities you completed on your visit to The University of Sydney

1. Where did your energy come from? .....
2. Where did the rocket's energy come from? .....
3. Finish these sentences
  - a. A force is a .....
  - b. To get lift off you need equal and opposite .....
4. Talk about the next questions with your friends. Your teacher may let you try some experiments to test your ideas.
  - a. What do you think would happen if you used two tablets in your rocket?  
.....  
.....
  - b. How could you make your rocket fly further?  
.....  
.....
5. We talked about a scientist called (Isaac) Newton. Do some research in the library, using books and the internet to see what else you can find out about him.